In the Claims

Claims 1 - 10 (Cancelled)

11. (Currently Amended) A high-strength steel sheet having excellent deep drawability, an average r value of 1.2 or more, and a composition ~~comprising~~ consisting of, by % by mass:

C: about 0.010 to about 0.050%;

Si: about 1.0% or less;

Mn: about 1.0 to about 3.0%;

P: about 0.005 to about 0.1%;

S: about 0.01% or less;

Al: about 0.005 to about 0.5%;

N: about 0.01% or less;

Nb: about 0.01 to about 0.3%; and

the balance substantially including Fe and inevitable impurities, the Nb and C contents in steel satisfying the relation, (Nb/93)/(C/12) = 0.2 to 0.7 (wherein Nb and C represent the contents (% by mass) of the respective elements), and the steel microstructure containing a ferrite phase and a martensite phase at area ratios of about 50% or more and about 1% or more, respectively.

12. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 11, wherein the steel sheet satisfies the following relation between normalized X-ray integrated intensity ratios of (222) plane, (200) plane, (110) plane, and (310) plane parallel to the sheet plane at a 1/4 thickness of the steel sheet:

P(222)/{P(200) + P(110) + P(310)} 1.5 (wherein P(222), P(200), P(110), and P(310) are the normalized X-ray integrated intensity ratios of the (222) plane, (200) plane, (110) plane, and (310) plane, respectively, parallel to the sheet plane at a 1/4 thickness of the steel sheet).

13. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 11, further comprising at least one of Mo, Cr, Cu, and Ni in a total of about 0.5% by mass or less in addition to the composition.

14. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 11, further comprising about 0.1% by mass or less of Ti in addition to the composition, the contents of Ti, S, and N satisfying the following relation:

(Ti/48)/{(S/32) + (N/14)} 2.0 (wherein Ti, S, and N represents the contents (% by mass) of the respective elements).

15. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 11, further comprising a plated layer on a surface thereof.

16. (Currently Amended) A process for producing a high-strength steel sheet having excellent deep drawability, the process comprising a hot rolling step of finish-rolling a steel slab by hot rolling at a finisher delivery temperature of about 800°C or more and coiling the hot-rolled sheet at a coiling temperature of about 400 to about 720°C, a cold rolling step of cold-rolling the hot-rolled sheet to form a cold-rolled sheet, and a cold-rolled sheet annealing step of annealing the cold-rolled sheet at an annealing temperature of about 800 to about 950°C and then cooling the annealed sheet in a temperature range from the annealing temperature to about 500°C at an average cooling rate of about 5 °C/s or more, the steel slab having a composition consisting of, ~~containing~~ by % by mass:

C: about 0.010 to about 0.050%;

Si: about 1.0% or less;

Mn: about 1.0 to about 3.0%;

P: about 0.005 to about 0.1%;

S: about 0.01% or less;

Al: about 0.005 to about 0.5%;

N: about 0.01% or less; and

Nb: about 0.01 to about 0.3%;

the Nb and C contents in steel satisfying the relation, (Nb/93)/(C/12) = 0.2 to 0.7 (wherein Nb and C represent the contents (% by mass) of the respective elements).

17. (Currently Amended) A process for producing a high-strength steel sheet having excellent deep drawability, the process comprising a hot rolling step of hot-rolling a steel slab to form a hot-rolled sheet having an average crystal grain size of 8 m or less, a cold rolling step of cold-rolling the hot-rolled sheet to form a cold-rolled sheet, and a cold-rolled sheet annealing step of annealing the cold-rolled sheet at an annealing temperature of about 800 to about 950°C and then cooling the annealed sheet in a temperature range from the annealing temperature to about 500°C at an average cooling rate of about 5 °C/s or more, the steel slab having a composition consisting of ~~containing~~, by % by mass:

C: about 0.010 to about 0.050%;

Si: about 1.0% or less;

Mn: about 1.0 to about 3.0%;

P: about 0.005 to about 0.1%;

S: about 0.01% or less;

Al: about 0.005 to about 0.5%;

N: about 0.01% or less; and

Nb: about 0.01 to about 0.3%;

the Nb and C contents in steel satisfying the relation, (Nb/93)/(C/12) = 0.2 to 0.7 (wherein Nb and C represent the contents (% by mass) of the respective elements).

18. (Previously Presented) The process for producing the high-strength steel sheet having excellent deep drawability according to claim 16 or 17, wherein the steel slab further contains at least one of Mo, Cr, Cu, and Ni at a total of about 0.5% by mass or less in addition to the composition.

19. (Previously Presented) The process for producing the high-strength steel sheet having excellent deep drawability according to claim 16, wherein the steel slab further contains about 0.1% by mass or less of Ti in addition to the composition, the contents of Ti, S, and N satisfying the following relation:

(Ti/48)/{(S/32) + (N/14)} 2.0 (wherein Ti, S, and N represents the contents (% by mass) of the respective elements).

20. (Previously Presented) The process for producing the high-strength steel sheet having excellent deep drawability according to claim 16, further comprising a plating step of forming a plated layer on a surface of the steel sheet after the cold-rolled sheet annealing step.

21. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 12, further comprising at least one of Mo, Cr, Cu, and Ni in a total of about 0.5% by mass or less in addition to the composition.

22. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 12, further comprising about 0.1% by mass or less of Ti in addition to the composition, the contents of Ti, S, and N satisfying the following relation:

(Ti/48)/{(S/32) + (N/14)} 2.0 (wherein Ti, S, and N represents the contents (% by mass) of the respective elements).

23. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 13, further comprising about 0.1% by mass or less of Ti in addition to the composition, the contents of Ti, S, and N satisfying the following relation:

(Ti/48)/{(S/32) + (N/14)} 2.0 (wherein Ti, S, and N represents the contents (% by mass) of the respective elements).

24. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 12, further comprising a plated layer on a surface thereof.

25. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 13, further comprising a plated layer on a surface thereof.

26. (Previously Presented) The high-strength steel sheet having excellent deep drawability according to claim 14, further comprising a plated layer on a surface thereof.

27. (Previously Presented) The process for producing the high-strength steel sheet having excellent deep drawability according to claim 17, further comprising a plating step of forming a plated layer on a surface of the steel sheet after the cold-rolled sheet annealing step.

28. (Previously Presented) The process for producing the high-strength steel sheet having excellent deep drawability according to claim 18, further comprising a plating step of forming a plated layer on a surface of the steel sheet after the cold-rolled sheet annealing step.

29. (Previously Presented) The process for producing the high-strength steel sheet having excellent deep drawability according to claim 19, further comprising a plating step of forming a plated layer on a surface of the steel sheet after the cold-rolled sheet annealing step.

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ABSTRACT

~~The present invention provides~~ A ~~a~~ high-strength steel sheet is useful for applications to automobile steel sheets and the like and has ~~having~~ excellent deep drawability, a tensile strength (TS) of as high as 440 MPa or more, and a high r value (average r value ≥ 1.2), and a process for producing the steel sheet. The steel sheet has a composition containing, by % by mass, 0.010 to 0.050% of C, 1.0% or less of Si, 1.0 to 3.0% of Mn, 0.005 to 0.1% of P, 0.01% or less of S, 0.005 to 0.5% of Al, 0.01% or less of N, and 0.01 to 0.3% of Nb, the Nb and C contents in steel satisfying the relation, (Nb/93)/(C/12) = 0.2 to 0.7, and the balance substantially including Fe and inevitable impurities. The steel microstructure contains a ferrite phase and a martensite phase at area ratios of 50% or more and 1% or more, respectively, and the average r value is 1.2 or more.